Abstracts

Importance of Normal Field Continuity in Inhomogeneous Scattering Calculations

X. Yuan, D.R. Lynch and K. Paulsen. "Importance of Normal Field Continuity in Inhomogeneous Scattering Calculations." 1991 Transactions on Microwave Theory and Techniques 39.4 (Apr. 1991 [T-MTT]): 638-642.

The finite element method with conventional scalar bases is coupled with the moment method to handle the three-dimensional scattering and/or absorption from inhomogeneous, arbitrarily shaped objects. The C/sup 0/ finite element basis enforces continuity of both normal and tangential E at element boundaries within homogeneous regions. At dielectric interfaces, the continuity of normal D and tangential E are enforced in a strong sense. Excellent agreement between the numerical solution and the Mie series is obtained for both internal and scattered fields for homogeneous and layered spheres under plane wave illumination. Compared to an alternative finite element method using edge elements which lack strong enforcement of normal field continuity, the present method produces higher-order approximations, especially at dielectric interfaces, with no penalties in computational effort.

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